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Signed this 24th day of December, 2003



Shinya Miyamoto

PATENT OFFICE
Japanese Government

**This is to certify that the annexed is a true copy of the following application
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[Title of the Invention] VEHICLE HEADLAMP SYSTEM

[Claim]

[Claim 1] A vehicle headlamp system with headlamps, each of which contains a lamp unit for emitting beams forward with a predetermined luminous intensity distribution within a lamp body, comprising:

vehicle-to-vehicle distance measuring means for measuring the vehicle-to-vehicle distance between one's own vehicle and a preceding vehicle, and

variable luminous intensity control means for varying said luminous intensity distribution according to said vehicle-to-vehicle distance when the speed of one's own vehicle exceeds a predetermined value.

[Claim 2] A vehicle headlamp system as claimed in claim 1, wherein said variable luminous intensity control means fixes said luminous intensity distribution when the speed of one's own vehicle stays at said predetermined value or lower.

[Claim 3] A vehicle headlamp system as claimed in either claim 1 of claim 2, wherein

said luminous intensity distribution is a luminous intensity distribution having a cut-off line at the upper end and wherein

said variable luminous intensity control means varies said luminous intensity distribution by vertically moving the position of said cut-off line.

[Claim 4] A vehicle headlamp system as claimed in claim 3, wherein said variable luminous intensity control means fixes said

cut-off line to the lowermost position while the speed of one's own vehicle is kept at said predetermined value or lower.

[Claim 5] A vehicle headlamp system as claimed in one of claims 1 - 4, wherein said headlamp is provided on the left and right sides of a vehicle, thus forming a pair of headlamps and wherein said vehicle-to-vehicle distance measuring means is contained in the lamp body of one headlamp out of the pair of headlamps, whereas an auxiliary lamp is contained in a position corresponding to said vehicle-to-vehicle distance measuring means in the lamp body of the other headlamp.

[Claim 6] A vehicle headlamp system as claimed in claim 5, wherein the other headlamp is a headlamp located on the road shoulder side, whereas said auxiliary lamp is a lamp for irradiating the road shoulder portion of a road surface ahead of a vehicle.

[Detailed Description of the Invention]

[0001]

[Technical Field to Which the Invention Belongs]

The present invention relates to a vehicle headlamp system with headlamps, each of which contains a lamp unit in a lamp body.

[0002]

[Description of the Related Art]

There are conventionally known vehicle headlamps containing a lamp unit in a lamp body and also those which are designed to vary the luminous intensity distribution formed by such a lamp unit in response to one's vehicle speed.

[0003]

[Problems to be Solved by the Invention]

However, an arrangement for only varying a luminous intensity distribution in response to the vehicle speed is hardly capable of beam emission with a luminous intensity distribution corresponding to the travel conditions of a vehicle.

[0004]

An object of the present invention made in view of the foregoing problem is to provide a vehicle headlamp system with headlamps, each of which contains a lamp unit for emitting beams forward with a predetermined luminous intensity distribution within a lamp body in such a manner as to carry out beam emission with a luminous intensity distribution corresponding to the travel conditions of a vehicle.

[0005]

[Means for Solving the Problems]

In order to accomplish the object above, the invention is arranged so that a luminous intensity distribution may be varied in consideration of not only the speed of one's own vehicle but also the vehicle-to-vehicle distance between one's own vehicle and a vehicle running ahead of one's own vehicle.

[0006]

More specifically, a vehicle headlamp system with headlamps according to the invention, each of which contains a lamp unit for emitting beams forward with a predetermined luminous intensity distribution within a lamp body, comprises:

vehicle-to-vehicle distance measuring means for measuring the vehicle-to-vehicle distance between one's own vehicle and a preceding vehicle, and

variable luminous intensity control means for varying the

luminous intensity distribution according to the vehicle-to-vehicle distance when the speed of one's own vehicle exceeds a predetermined value.

[0007]

The 'lamp unit' is not limited to what has a specific construction but may be a so-called parabolic lamp unit having a reflector formed with, for example, a rotary parabolic surface or the like as a reference or otherwise a so-called projector type lamp unit having a light source disposed in a manner substantially coaxial with an optical axis extending in the longitudinal direction of the vehicle, a reflector for reflecting light from the light source forward closer to the optical axis, a condenser lens provided in front of the reflector, and a shade which is provided between the condenser lens and the reflector and used for shielding part of the light reflected from the reflector.

[0008]

In connection with the light source of the 'lamp unit', it is not limited to a specific one in construction but may be the discharge light-emitting portion of a discharge bulb, the filament of an incandescent bulb such as a halogen bulb or the like.

[0009]

The 'vehicle-to-vehicle distance measuring means' is not limited to a specific means in construction but may be, for example, a laser radar or the like as long as the means is capable of measuring the vehicle-to-vehicle distance between one's own vehicle and a preceding vehicle.

[0010]

The method of 'varying the luminous intensity distribution' by the variable luminous intensity control means is not limited to a specific method but may be a method of varying the configuration of the luminous intensity distribution by moving the component elements of the lamp unit such as a shade, a light source bulb, a reflector and the like or varying the direction of the luminous intensity distribution by tilting the lamp unit itself.

[0011]

[Operation/Working Effect]

As described above, the vehicle headlamp system according to the invention is such that the lamp unit is contained in the lamp body of each headlamp to carry out forward beam emission with the predetermined luminous intensity distribution by using the lamp unit. Further, the vehicle headlamp system is provided with the vehicle-to-vehicle distance measuring means for measuring the vehicle-to-vehicle distance between one's own vehicle and a preceding vehicle and when the speed of one's own vehicle exceeds the predetermined value, the luminous intensity distribution of the lamp unit is varied by the variable luminous intensity control means according to the vehicle-to-vehicle distance therebetween. Therefore, the following operation/working effect is achievable.

[0012]

With an increase in the vehicle speed to a certain degree, importance is attached to securing sufficient forward visibility of the road surface ahead of the vehicle in view of increasing the travel safety of the vehicle. In this respect, as the luminous intensity distribution of the lamp unit is varied with the distance

to a preceding vehicle according to the invention, the remote visibility is increased by turning the luminous intensity distribution slightly upward when the vehicle-to-vehicle distance is long, whereas the luminous intensity distribution is turned slightly downward when the vehicle-to-vehicle distance is short in order not to give the driver of a preceding vehicle a glare, whereby beam emission can be carried out with a luminous intensity distribution according to the travel conditions of the vehicle.

[0013]

With the arrangement above, by adapting the variable luminous intensity control means to fix the luminous intensity distribution while the speed of one's own vehicle is kept at the predetermined value or lower, a useless feeling of wrongness resulting from the change of the low-beam luminous intensity distribution is prevented from being given to the driver of a preceding vehicle in the low vehicle speed zone in which the remote visibility is not so much important.

[0014]

The variation modes of the luminous intensity distribution are not restricted as described above and in case where the luminous intensity distribution has the cut-off line at its upper end, beam emission can be carried out with a luminous intensity distribution according to the travel conditions of the vehicle by vertically moving the position of the cut-off line so as to vary the luminous intensity distribution.

[0015]

While the vehicle is running at the predetermined value or

lower, the cut-off line is fixed to the lowermost position to ensure that no glare is given to the driver of a preceding vehicle.

[0016]

In four-wheeled vehicles in general, since a headlamp is provided on both left and right sides of the vehicle forming a pair of headlamps, by containing the vehicle-to-vehicle distance measuring means in the lamp body of the headlamp on one side out of the pair of left- and right-side headlamps, and containing an auxiliary in a position corresponding to the vehicle-to-vehicle distance measuring means in the lamp body of the headlamp on the other, the vehicle-to-vehicle distance measuring means can be incorporated in the headlamp without a feeling of wrongness about the design of both headlamps.

[0017]

The auxiliary lamp is then provided in the headlamp positioned on the road shoulder side and used for irradiating the road shoulder portion of the road surface ahead of the vehicle in order to irradiate the road shoulder portion with a reasonable lamp arrangement.

[0018]

[Mode for Carrying Out the Invention]

An embodiment of the present invention will now be described with reference to the drawings.

[0019]

Fig. 1 is an overall block diagram illustrating a vehicle headlamp system embodying the invention.

[0020]

As shown in Fig. 1, a vehicle headlamp system 100 is provided to a large-sized vehicle such as a truck and comprises a pair of

left- and right-side headlamps 10L and 10R disposed in the front end portion of a vehicle, a vehicle-to-vehicle distance sensor 20 (a vehicle-to-vehicle distance measuring means) incorporated in the right-side headlamp 10R, a control unit 102 (a variable luminous intensity control means) connected to the headlamps 10L and 10R, a switch unit 104 connected to the control unit 102, and a battery power supply 106 connected to the control unit 102.

[0021]

In each of the headlamps 10L and 10R, a lamp unit 22 forming a headlamp body, various lamps and the like are housed in a lamp chamber formed with a transparent cover 12 and a lamp body 14.

[0022]

More specifically, the left-side headlamp 10L contains the lamp unit 22, a front turn-signal lamp 24, a cornering lamp 26, a driving lamp 28, and an adverse weather lamp (bad weather lamp) 30, whereas the right-side headlamp 10R contains the lamp unit 22, a front turn-signal lamp 24, a cornering lamp 26, a driving lamp 28, and the vehicle-to-vehicle distance sensor 20.

[0023]

In any one of the headlamps 10L and 10R, the lamp unit 22 is positioned slightly upward in the center of the lamp chamber, and the front turn-signal lamp 24 is disposed below and near the lamp unit 22. The cornering lamp 26 and the driving lamp 28 are laterally and integrally formed in a manner adjacent to each other and also disposed below and near the front turn-signal lamp 24. Further, the adverse weather lamp 30 of the left-side headlamp 10L and the vehicle-to-vehicle distance sensor 20 of the right-side headlamp

10R are disposed above and near the respective lamp units 22. The vehicle-to-vehicle distance sensor 20 is incorporated in a housing 16 symmetrical in shape to the reflector 30a of the adverse weather lamp 30.

[0024]

The lamp unit 22 carries out either high- or low-beam emission and in the low-beam emitting condition, it varies a luminous intensity distribution according to the travel conditions as will be described later.

[0025]

The front turn-signal lamp 24 is a lamp operating together with the operation of a direction indicator to flash on and off.

The cornering lamp 26 is a lamp for throwing light in the direction in which a vehicle is being driven around a curve and lighted with the intensity of the lamp being varied in the manner interlocked with the operation of the direction indicator or the rotation of a steering wheel in order to irradiate a sideways area in a direction of 45 degrees with respect to the vehicle. The driving lamp 28 is an additionally turned-on lamp for increasing remote visibility in the high-beam emitting condition and optionally and selectively turned on by a driver. The adverse weather lamp 30 is a lamp for increasing visibility by irradiating a road shoulder portion when the road surface ahead of the vehicle is wet and hard to watch through during the travel of the vehicle in rainy weather and is turned on when rain drops are detected.

[0026]

The vehicle-to-vehicle distance sensor 20 is an infrared laser

radar for causing the light emitting portion 20a to emit a pulse beam forward and also causing the light receiving portion 20b to receive the pulse beam reflected from a vehicle running ahead of one's own vehicle whereby to measure the distance between both vehicles from the time difference between the beam emission timing and the beam reception timing.

[0027]

The control unit 102 is to receive the signals detected from the vehicle-to-vehicle distance sensor 20 and various sensors such as a vehicle speed sensor, a rain drop sensor and the like, and various operating signals from the switch unit 104 including a beam switching operation, a driving lamp turning on-off operation and the like. On the basis of these input signals, further, the control unit 102 performs control over the on-off of the lamp units 22 of the respective headlamps 10L and 10R as well as the lamps 24, 26, 28 and 30. Moreover, the control unit 102 performs control over the beam switching of the lamp units 22 of the headlamps 10L and 10R and variable luminous intensity distribution in the low-beam emitting condition.

[0028]

Fig. 2 is a sectional side view of the lamp unit 22; and Fig. 3, a detailed view of the principal part of Fig. 2.

[0029]

As shown in Fig. 2, the lamp unit 22 is a projector type lamp unit having a discharge bulb 32, a reflector 34, a holder 36, a condenser lens 38, a retaining ring 40, a shade 42, and shade driving mechanism 44.

[0030]

The discharge bulb 32 is a metal halide bulb that is fitted to a reflector 34 such that the discharge light emitting portion 32a (a light source) of the discharge bulb 32 is disposed coaxially with an optical axis Ax.

[0031]

The reflector 34 has a substantially elliptic spherical reflective surface 34a with the optical axis Ax as a central axis.

The reflective surface 34a is formed such that the sectional configuration including the optical axis Ax is elliptic and that its eccentricity is set to grow gradually greater from the vertical to horizontal section. However, the rear apex of the ellipse forming each of the sections is set at the same position. The light source 32a is disposed at a first focal point F1 of the ellipse forming the vertical section of the reflective surface 34a. Therefore, the reflective surface 34a is adapted to reflect light from the light source 32a forward with slight deviation to the optical axis Ax and also to substantially converge the light to a second focal point F2 of the ellipse within the vertical section including the optical axis Ax then.

[0032]

The holder 36 has a cylindrical shape extending forward from the front end opening portion of the reflector 34 and is fixedly supported in its rear end portion and also fixedly supports the condenser lens 38 via the retaining ring 40 in its front end portion.

Further, a cutout portion 36a is formed in the lower end portion of the holder 36.

[0033]

The condenser lens 38 is a flat convex lens having a convex front-side surface and a flat rear-side surface, the rear-side focal point position being placed in conformity with the second focal point F2 of the reflective surface 34a of the reflector 34, whereby the condenser lens 38 allows the light reflected from the reflective surface 34a of the reflector 34 to concentrate on a point close to the optical axis Ax.

[0034]

The shade 42 comprises a shade body portion 42A extending substantially along a vertical plane crossing the optical axis Ax at right angles, a substantially semi-cylindrical portion 42B extending forward from the peripheral edge portion of the shade body portion 42A, and a bracket portion 42C extending downward through the cutout portion 26a of the holder 36 from the lower end portion of the substantially semi-cylindrical portion 42B, the shade 42 being pivotally provided in the lower portion of the inner space of the holder 36. More specifically, the shade 42 is supported by the holder 36 via a pivotal pin 46 in the front upper end portions of both the left and right sides of the substantially semi-cylindrical portion 42B, so that the shade 42 is able to pivot between low- and high-beam forming positions (positions shown by solid lines) around a horizontal axis connecting both pivotal pins 46.

[0035]

When the shade 42 is in the low-beam forming position, the upper end edge 42Aa of the shade body portion 42A is so arranged as to pass the second focal point F2 and to remove the upward light

emitted from the lamp unit 22 by partly shading the light reflected from the reflective surface 34a whereby to obtain light for low-beam emission (the beams shown by solid lines) carried out downwardly with respect to the optical axis Ax. Thus the low-beam luminous intensity distribution P(L) of the left-side luminous intensity having a so-called Z-shaped cut-off line at laterally different levels is formed as shown in Fig. 4(a). Then the upper stage portion of the cut-off line CL is set at substantially the same position as a H - H line and the lower stage portion of the cut-off line CL is set a 0.57 degrees lower position with respect to the H - H line.

[0036]

When the shade 42 is in the high-beam forming position, on the other hand, the shade 42 allows the upward beam emission from the lamp unit 22 by releasing the shading of the light reflected from the reflective surface 34a whereby to obtain light for high-beam emission (the beams shown by solid and chain double-dashed lines).

Thus the high-beam luminous intensity distribution P(H) is formed as shown in Fig. 4(b). Areas shown by HZ in these low- and high-beam luminous intensity distributions P(L) and P(H) are hot zones (high luminous intensity areas) in the respective luminous intensity distributions.

[0037]

The shade driving mechanism 44 is provided with a motor driving unit 48 and a tension coil spring 50 and used to pivot the shade 42 between the low- and high-beam forming positions and also to stop the shade 42 in any desired position therebetween. According

to this embodiment of the invention, the shade 42 can be stopped in an upward correcting position ($LOW + \alpha$) closer to the high-beam forming position (HIGH) rather than the low-beam forming position and a downward correcting position ($LOW - \beta$) further separated from the high-beam forming position than the low-beam forming position as shown by a broken line in Fig. 3. The aforementioned angles α and β are set as $\alpha = 0.4$ degrees and $\beta = 0.5$ degrees.

[0038]

While the output shaft 48a of the motor driving unit 48 is so disposed as to extend in parallel to the optical axis Ax, the motor driving unit 48 is fixedly fitted in a motor housing portion 24b formed in the lower area of the reflector 24. This motor driving unit 48 is used to move the output shaft 48a in the longitudinal direction of the vehicle as a motor (not shown) operates to drive the motor driving unit 48 via a gear (not shown) and brought into contact with the bracket portion 42C of the shade 42 in the front end spherical portion of the output shaft 48a.

[0039]

The tension coil spring 50 is extended in parallel to the optical axis Ax and its front end portion is retained by the bracket portion 42C of the shade 42, whereas its rear end portion is retained by a tab 34c projecting downward from the motor housing portion 34b.

The tension coil spring 50 is normally used to resiliently urge the shade 42 toward the low-beam forming position whereby to prevent the shade 42 from having backlash by absorbing the backlash of the motor driving unit 48.

[0040]

The contents of beam emission control of the lamp unit 22 performed in the vehicle headlamp system 100 according to this embodiment of the invention will now be described.

[0041]

While the vehicle is running on a straight flat road, the beam emission is carried out with the luminous intensity distribution as shown in Fig. 4. At this time, the control unit 102 causes the shade 42 move to the low- or high-beam forming position in response to the operation of a beam changeover switch in order to carry out the beam emission with the low-beam luminous intensity distribution $P(L)$ as shown in Fig. 4(a) or the high-beam luminous intensity distribution $P(H)$ as shown in Fig. 4(b).

[0042]

At this time, the low-beam luminous intensity distribution $P(L)$ is varied with the speed of one's own vehicle and the vehicle-to-vehicle distance to a preceding vehicle. The low-beam luminous intensity distribution $P(L)$ is varied by moving the shade 42 from the low-beam forming position (LOW) to the upward correcting position ($LOW + \alpha$) or downward correcting position ($LOW - \beta$) and vertically moving the position of the cut-off line CL.

[0043]

In an intermediate-high vehicle speed zone with a vehicle speed of $V > 25$ km/h, the position of the cut-off line CL is raised or lowered according to the vehicle-to-vehicle distance L as it is important to secure sufficient forward visibility of the road surface ahead of the vehicle in view of increasing vehicle travel safety.

[0044]

More specifically, in a normal travel condition with $30\text{m} < L < 100\text{m}$ as the vehicle-to-vehicle distance L , the lower stage portion of the cut-off line CL is held at a reference position (i.e., a 0.57 degrees lower position from the $H - H$ line) as shown by solid lines in Fig. 5(a). When the preceding vehicle is long away with $L > 100\text{m}$ as the vehicle-to-vehicle distance L , the cut-off line CL is displaced upward by 0.4 degrees from the reference position as shown by broken lines in Fig. 5(a) to increase the remote visibility of the road surface ahead of the vehicle. Since the preceding vehicle is long away or non-existent, no great glare is given to the driver of a preceding vehicle even though the luminous intensity distribution is turned upward. When the preceding vehicle is very close with $L \leq 30\text{m}$ as the vehicle-to-vehicle distance L , the cut-off line CL is displaced downward by 0.5 degrees as shown by chain lines in Fig. 5(a) to decrease a glare against the driver of a preceding vehicle. As one's own vehicle is following the preceding vehicle then, the remote visibility of the road surface ahead of one's own vehicle is not so important.

[0045]

In a low vehicle speed area (including a standing condition) with a vehicle speed of $V \leq 25\text{km}$, on the other hand, it is not necessary to increase the remote visibility of the road surface ahead of one's own vehicle but is important not to give a glare to the driver of a preceding vehicle. Consequently, as shown by the solid lines in Fig. 5(b), the cut-off line CL is displaced downward by 0.5 degrees from the reference position (shown by chain double-dashed lines in Fig. 5(b) irrespective of the vehicle-to-vehicle distance.

Therefore, the useless upwardly-scattered light component contained in the beam emitted from the lamp unit 22 is prevented from being incident on the room mirror or the like of the preceding vehicle and this effectively prevents glare from being given to the driver of a preceding vehicle. Moreover, by thus fixing the cut-off line CL to the position displaced downward by 0.5 degrees from the reference position, a useless feeling of wrongness resulting from the change of the low-beam luminous intensity distribution $P(L)$ is prevented from being given to the driver of a preceding vehicle.

[0046]

Fig. 6 shows a luminous intensity distribution of light for irradiating the road shoulder $P(s)$, which light is emitted from the adverse weather lamp 30 to the road shoulder portion S of the road surface ahead of the vehicle together with the low-beam luminous intensity distribution $P(L)$ (Fig. 6(a)) and the high-beam luminous intensity distribution $P(H)$ (Fig. 6(b)).

[0047]

As the road surface ahead of the vehicle is wet during the travel of the vehicle in rainy weather, the visibility is worsened and driving becomes hardly easy. However, the visibility of the road shoulder portion S is relatively good and by irradiating the road shoulder portion S, attempts are made to increase the visibility and improve travel safety. As the adverse weather lamp 30 is provided in the left-side headlamp 10L then, the road shoulder portion S can be irradiated without greatly curving the direction of beam emission to the left.

[0048]

As set forth above in detail, the vehicle headlamp system 100 according to this embodiment of the invention is provided with the pair of left- and right-side headlamps 10L and 10R respectively having the lamp units 22 containing the lamp bodies 14. Further, the vehicle-to-vehicle distance sensor 20 for measuring the vehicle-to-vehicle distance L between one's own vehicle and the preceding vehicle is incorporated in the right-side headlamp 10L and when the speed of one's own vehicle exceeds 25km/h, the low-beam luminous intensity distribution $P(L)$ of the lamp unit 22 is varied by the control unit 102 according to the vehicle-to-vehicle distance L , so that the beam emission can be carried out with the luminous intensity distribution according to the travel conditions of the vehicle. In other words, when the vehicle-to-vehicle distance L is long, the remote visibility is increased by slightly turning the low-beam luminous intensity distribution $P(L)$ upward, whereas when the vehicle-to-vehicle distance L is short, a glare is prevented from being given to the driver of a preceding vehicle by slightly turning the low-beam luminous intensity distribution $P(L)$ downward.

[0049]

Since the vehicle headlamp system 100 according to this embodiment of the invention is specifically intended for large-sized vehicles, the lamp unit 22 is located at a considerable height above the ground and this tends to give a glare to the driver of a preceding vehicle. Therefore, it is very effective to slightly turn the low-beam luminous intensity distribution $P(L)$ downward as occasion demands.

[0050]

While the vehicle is running at a vehicle speed V of 25 km/h

or lower, as the low-beam luminous intensity distribution $P(L)$ is fixed then, a useless feeling of wrongness resulting from the change of the low-beam luminous intensity distribution $P(L)$ is prevented from being given to the driver of a preceding vehicle in the low vehicle speed zone in which the remote visibility is not so much important.

[0051]

As the low-beam luminous intensity distribution $P(L)$ is varied by vertically moving the cut-off line CL according to this embodiment of the invention, it is possible to delicately vary the low-beam luminous intensity distribution $P(L)$, whereby the beam emission can be carried out with a luminous intensity distribution according to the travel conditions of the vehicle.

[0052]

While the vehicle is running at a vehicle speed V of 25 km/h or lower, the cut-off line CL is fixed to the lowermost position to ensure that no glare is given to the driver of a preceding vehicle.

[0053]

According to this embodiment of the invention, the vehicle-to-vehicle distance sensor 20 is contained in the lamp body 14 of the right-side headlamp 10R out of the pair of left- and right-side headlamps 10L and 10R, whereas the adverse weather lamp 30 is contained in a position corresponding to the vehicle-to-vehicle distance sensor 20 in the lamp body 14 of the left-side headlamp 10L, so that the vehicle-to-vehicle distance sensor 20 is incorporated in the headlamp 10R without a feeling of wrongness about the design of both headlamps 10L and 10R.

[0054]

As the adverse weather lamp 30 is provided in the left-side headlamp 10L positioned on the road shoulder side then, the luminous intensity distribution of light for irradiating the road shoulder P(s) is formable with a reasonable lamp arrangement.

[0055]

Although the vehicle headlamp system for the left-side luminous intensity distribution has been described according to the above-described embodiment of the invention, similar operation/working effect is made achievable according to the embodiment thereof by laterally reversely disposing both headlamps 10L and 10R with respect to even the vehicle headlamp system for the right-side luminous intensity distribution.

[0056]

The reference position of the low-beam luminous intensity distribution P(L) is such that the lower stage portion of the cut-off line CL is set at the position downward by 0.57 degrees from the H - H line and the upward and downward correcting positions are set at the positions respectively deviated by 0.4 degrees and 0.5 degrees from the reference position according to the above-described embodiment of the invention. However, the upward and downward correcting positions may be set at any other values.

[0057]

Although it has been arranged that the emission control of the lamp unit 22 is performed differently with a vehicle speed of 25 km/h as a boundary according to the above-described embodiment of the invention, any vehicle speed other than 25 km/h may be employed

as occasion demands. With respect to the vehicle-to-vehicle distance, though the emission control of the lamp unit 22 is performed differently with 30m and 100m as boundaries according to the above-described embodiment of the invention, any vehicle-to-vehicle distances other than 30m and 100m may be employed as well.

[Brief Description of the Drawings]

[Figure 1]

An overall block diagram illustrating a vehicle headlamp system embodying the invention.

[Figure 2]

A sectional side view of each lamp unit for use in constituting the vehicle headlamp system.

[Figure 3]

A detailed view of the principal part of Fig. 2.

[Figure 4]

Diagrams illustrating a luminous intensity distribution of light emitted ahead of a vehicle from the lamp unit.

[Figure 5]

Diagrams illustrating a luminous intensity distribution explanatory of contents of beam emission control in the vehicle headlamp system.

[Figure 6]

A luminous intensity distribution of light for irradiating a road shoulder, which light is emitted ahead of the vehicle from an adverse weather lamp of the vehicle headlamp system.

[Description of Reference Numerals and Signs]

10L, 10R headlamps

- 12 transparent cover
- 14 lamp body
- 16 housing
- 20 vehicle-to-vehicle distance sensor (vehicle-to-vehicle distance measuring means)
- 20a light emitting portion
- 20b light receiving portion
- 22 lamp unit
- 24 front turn-signal lamp
- 26 cornering lamp
- 28 driving lamp
- 30 adverse weather lamp
- 32 discharge bulb
- 32a discharge light emitting portion (light source)
- 34 reflector
- 34a reflective surface
- 34b motor housing portion
- 34c tab
- 36 holder
- 38 condenser lens
- 40 retaining ring
- 42 shade
- 42A shade body portion
- 42Aa upper end edge
- 42B substantially semi-cylindrical portion
- 42C bracket portion
- 44 shade driving mechanism

46 pivotal pin
48 motor driving portion
48a output shaft
50 helical tension spring
100 vehicle headlamp system
102 control unit
104 switch unit
106 battery power supply
Ax optical axis
CL cut-off line
F1 first focal point
F2 second focal point
HZ hot zone (high luminous intensity area)
P(H) high-beam luminous intensity distribution
P(L) low-beam luminous intensity distribution
P(s) luminous intensity distribution for irradiating the road
shoulder P(s)

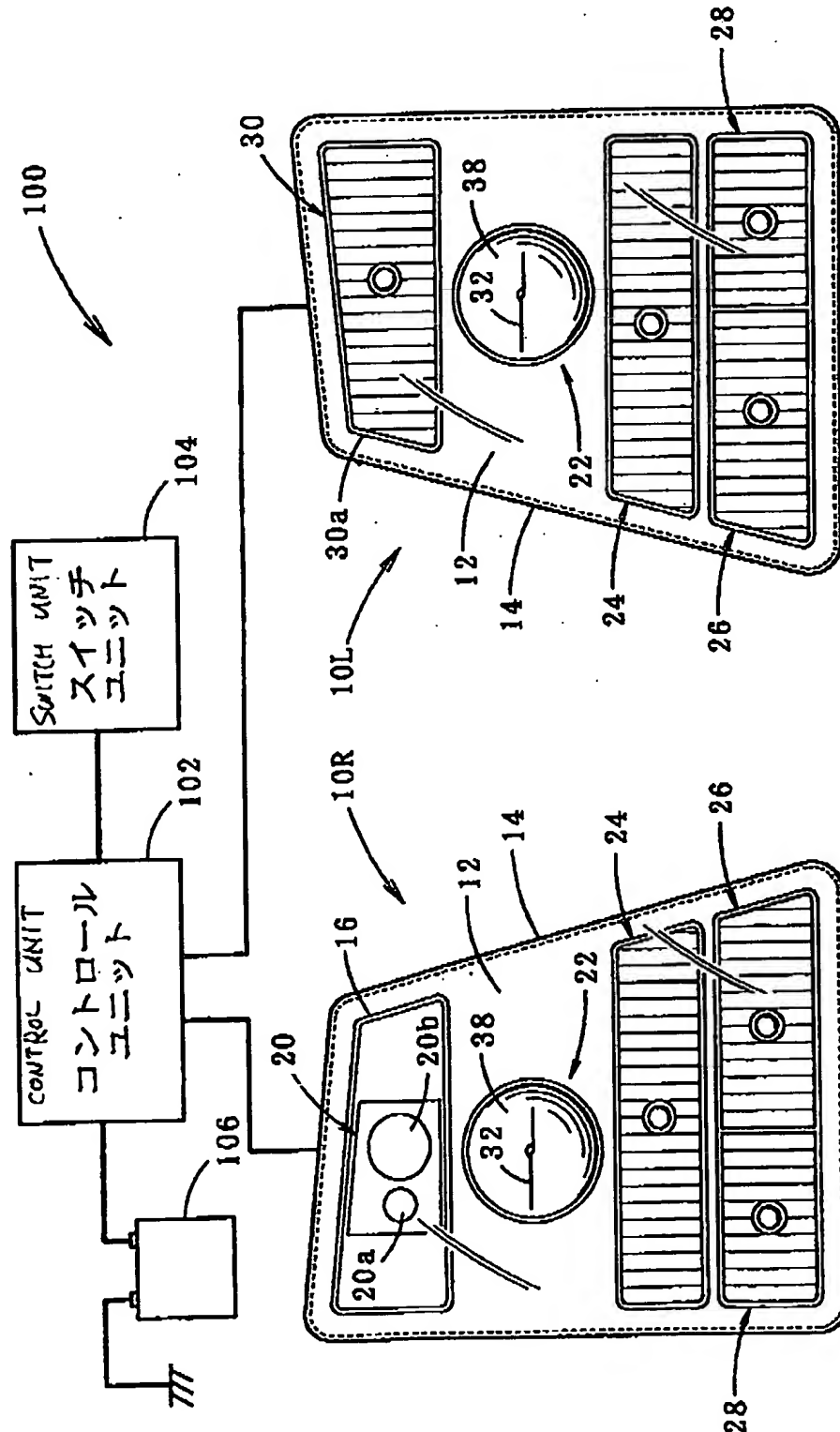
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特願2000-203769

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【書類名】—図面 (Document Name) Drawings

【図1】 Fig. 1

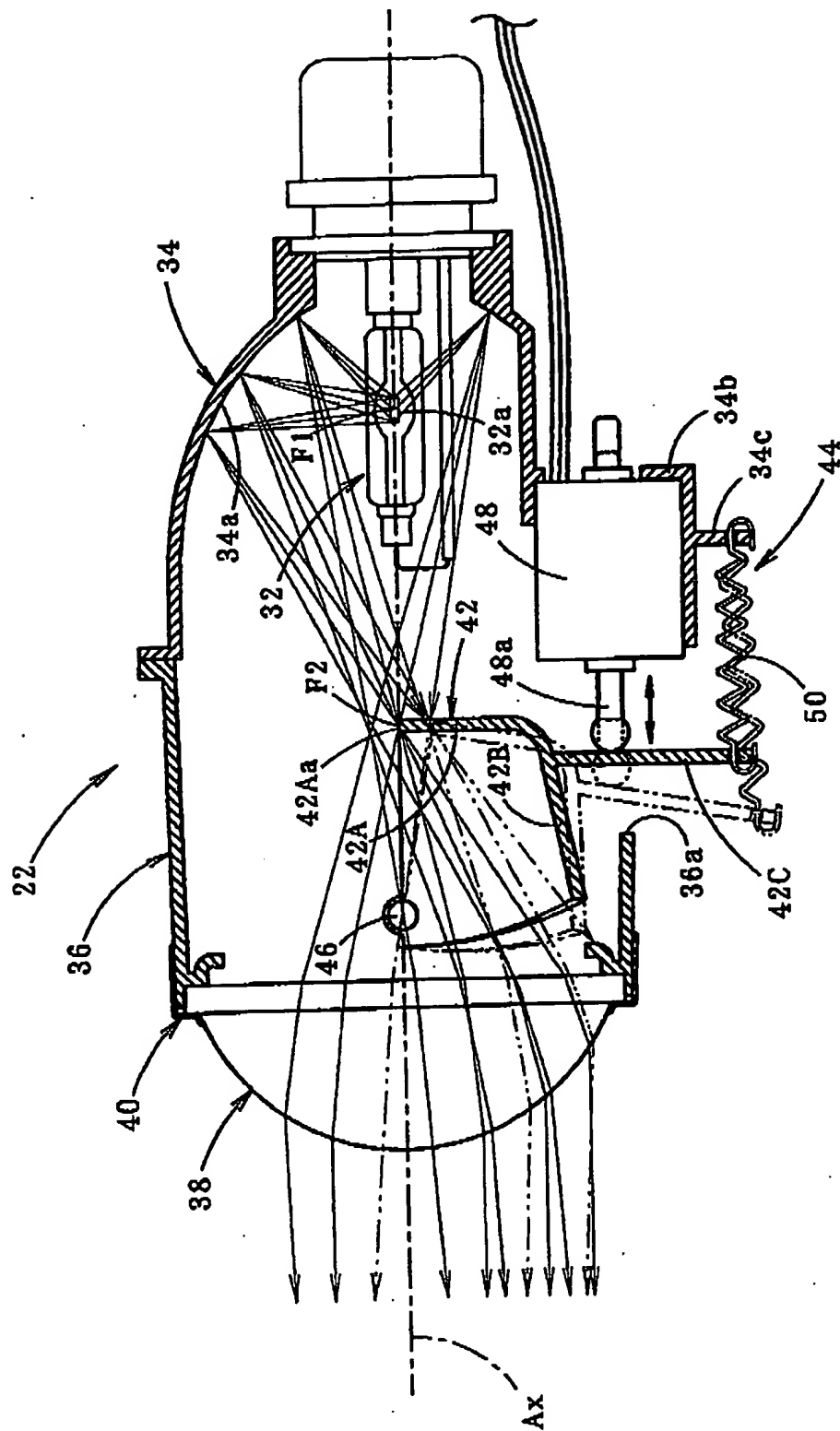


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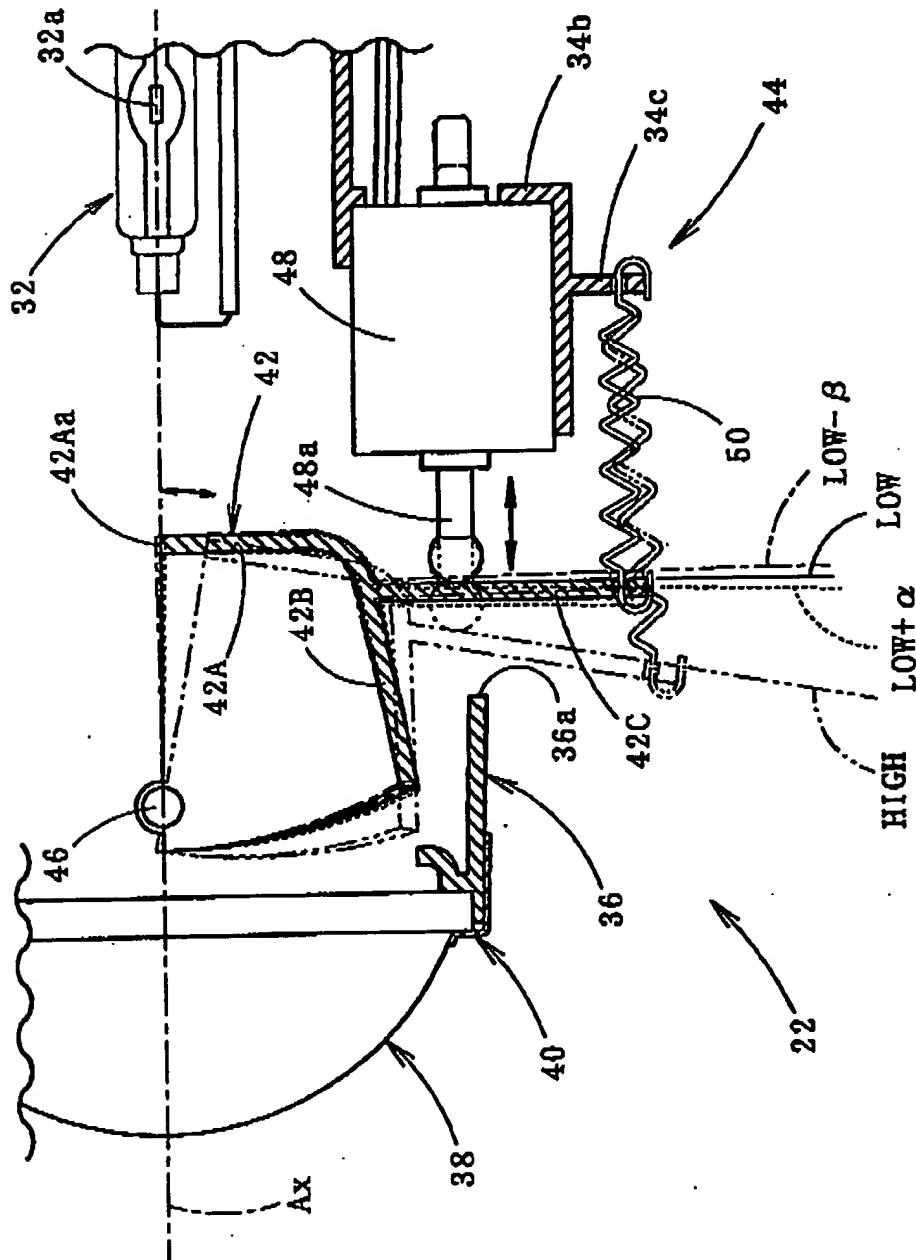
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【図2】 Fig. 2



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図31 Fig. 31

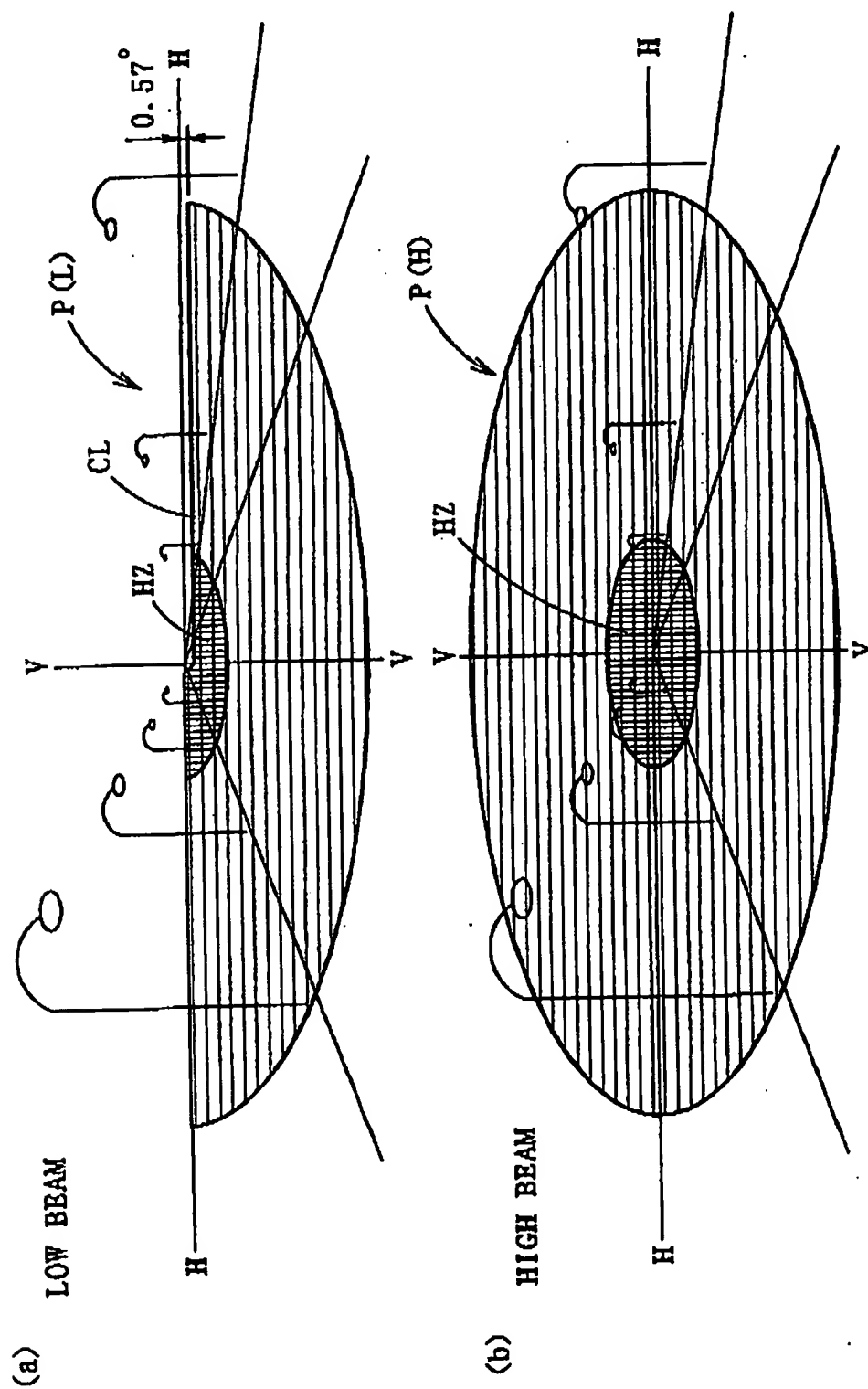


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[図4] Fig. 4

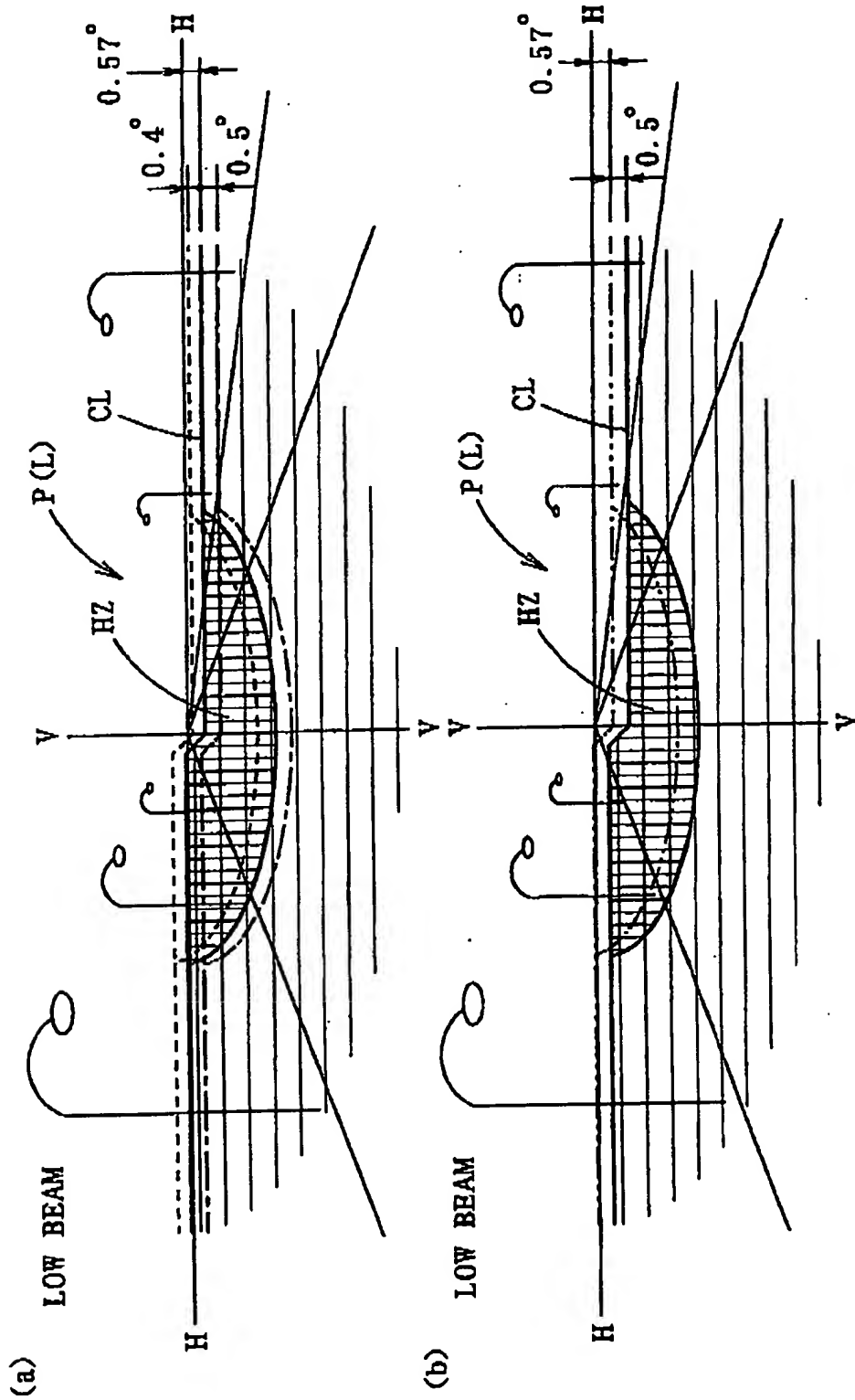


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図5 FIG. 5



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[図6] Fig. 6

